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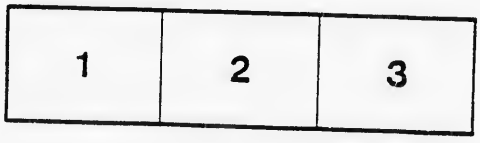

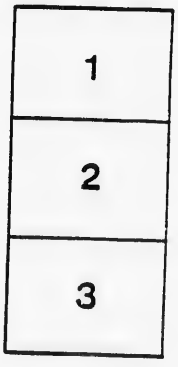

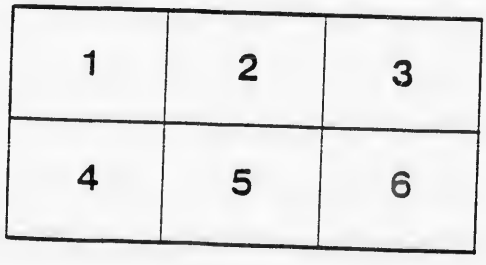

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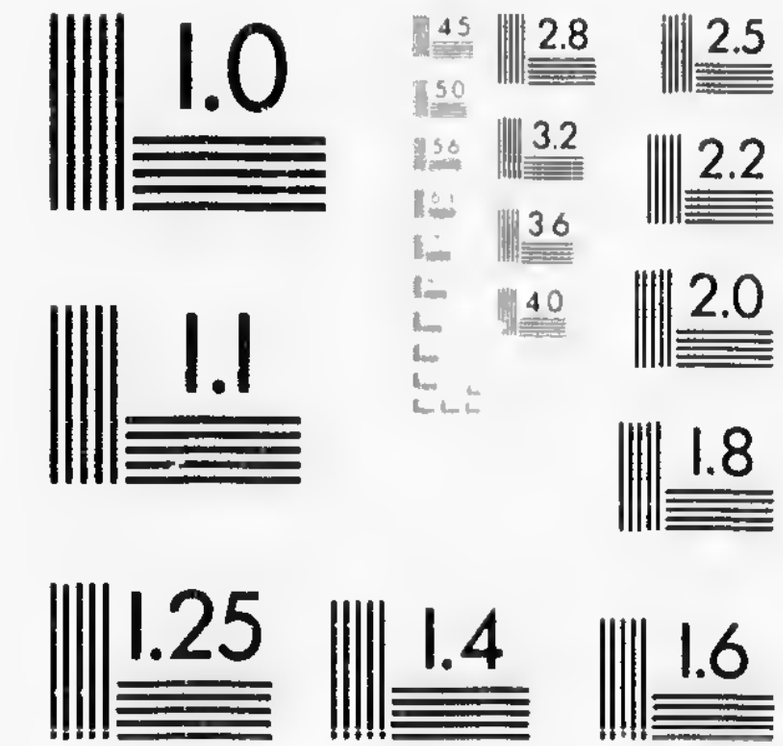

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CONTRIBUTIONS

TO

CANADIAN PALÆONTOLOGY

VOLUME II.

PART II.

CANADIAN FOSSIL INSECTS

BY

SAMUEL H. SCUDDER

4. Additions to the Coleopterous fauna of the interglacial clays of the Toronto district. With an Appendix by A. D. Hopkins on the Scolytid borings from the same deposits.

OTTAWA
PRINTED BY S. E. DAWSON, PRINTER TO THE QUEEN'S MOST EXCELLENT MAJESTY
1900

No. 710.

The present publication forms the second part of Volume II., "Contributions to Canadian Palæontology." It consists of a report by Dr. S. H. Scudder of Cambridge, Mass., upon the Coleoptera of the interglacial beds of the vicinity of Toronto, to which is added an appendix by Dr. A. P. Hopkins of Morgantown, W. Va., on Scolytid borings from the same deposits.

The Survey is greatly indebted to both of these gentlemen for their gratuitous work upon this contribution to the literature of fossil entomology.

GEORGE M. DAWSON.

Geological Survey of Canada,
Ottawa, December, 1900.

CONTRIBUTIONS TO CANADIAN PALÆONTOLOGY

VOLUME II.

CANADIAN FOSSIL INSECTS.

By Samuel H. Scudder.

4. *Additions to the Coleopterous fauna of the interglacial clays of the Toronto district. With an Appendix by A. D. Hopkins on the Scolytid borings from the same deposits.*

The occurrence of insect remains in interglacial beds at Scarborough, Ontario, was first made known by Hinde in 1877* and a couple of species of Carabidae found in them by him were described by me in the same year.† Later additions to the fauna, due to the efforts of Dr. Hinde, were published by me at different times‡, and finally embodied, with additions, in the second paper of the present volume§, in which, including four species found by Dr. Hinde in very similar beds near Cleveland, Ohio, the total number of determined species was stated to be twenty-nine, referable to five different families,—Carabidae, Hydrophilidae, Staphylinidae, Chrysomelidae and Scolytidae. None of the species could be referred to living forms.

Since then, Professor A. P. Coleman has taken up the investigation of these beds, including new outcrops of the same deposit in the vicinity or within the limits of Toronto‖, and has sent me a large mass of material, amounting in all to several hundred specimens, of which about one third were available by being sufficiently complete or characteristic. These are almost exclusively elytra of beetles and form the subject of the present paper; they consist of fifty-four species belonging to six different families, additional families being Dytiscidae, Gyrinidae and Curculionidae. Only seven of these fifty-four species have been found before in these beds, and all but two of the forty-seven additions are regarded, like those previously

* Can. Journ. Sc., n.s. xv, 399.

† Bull. U.S. Geol. Surv. Terr., III, 763-764.

‡ Can. Ent., XVIII, 133-135 (1886); Proc. Bost. Soc. Nat. Hist., XXIV, 467-468 (1890); Tert. Ins. N.A., passim, pl. 1 (1890).

§ The Coleoptera hitherto found fossil in Canada, 27-56, pl. 2-3 (1892).

‖ See his papers in Amer. Geol., XIII, 85-95 (1894); Journ. Geol. III, 622-645 (1895); and Bull. Geol. Soc. Amer., X, 165 176 (1899); as well as the Reports of the Committee on Canadian Pleistocene Flora and Fauna (A. P. Coleman, Secretary) in the Reports Brit. Assoc. Adv. Sc., for 1898, 1899 and 1900.

discovered, as extinct forms. The number of known interglacial forms is thereby much more than doubled, for it raises the total number to seventy-six belonging to thirty-three different genera and eight families of which the following is a complete list :—

CARABIDAE (36 sp., 9 gen.)

Elaphrus irregularis.
Loricera glacialis.
" *lutosa.*
" *exitu.*
Nebria extracta.
Bembidium glaciatum.
" *fragmentum.*
" *haywardi.*
" *vestigium.*
" *vanum.*
" *praeteritum.*
" *expletum.*
" *damnosum.*
Petrobus gelatus.
" *decessus.*
" *frigidus.*
Pterostichus abrogatus.
" *dormitans.*
" *aestitutus.*
" *fractus.*
" *destructus.*
" *gelidus.*
" *depletus.*
Badister antecursor.
Platynus casus.
" *hindei.*
" *halli.*
" *dissipatus.*
" *desuetus.*
" *harttii.*
" *dilapidatus.*
" *exterminatus.*
" *interglacialis.*
" *interitus.*
" *longaevus.*
Harpalus conditus.

DYTISCIDAE (8 sp., 3 gen.)

Hydroporus inanimatus.
" *inundatus.*
" *sectus.*
Agabus perditus.

GYRINIDAE (1 sp.)

Gyrinus confinis LeC.

HYDROPHILIDAE (3 sp., 3 gen.)

Helophorus rigescens.
Hydrochus amictus.
Cymbiodyta aestincta.

STAPHYLINIDAE (19 sp., 11 gen.)

Gymnusa absens.
Quedius deperditus.
Philonthus claudus.
Cryptobium detectum.
" *cinctum.*
Lathrobium interglaciale.
" *antiquatum.*
" *debilitatum.*
" *exesum.*
" *inhibitum.*
" *frustum.*
Oxyporus stiriacus.
Bledius glaciatus.
Geodromicus stiricidii.
Acidota crenata Fabr., var. nigra.
Arpedium stillicidii.
Olophrum celatum.
" *arcanum.*
" *dejectum.*

CHRYSOMELIDAE (2 sp., 1 gen.)

Donacia stiria.
" *pompatica.*

CURCULIONIDAE (6 sp., 4 gen.)

Eryeus consumptus.
Anthonomus eversus.
" *fossilis.*
" *lapsus.*

Coelambus derelictus.
" *cribrarius.*
" *infernalis.*
disjectus.
Orchestes avus.
Centrinus disjunctus.
SCOLYTIDAE (1 sp.)
Phlœosinus squalidens (borings.)

The comparison of this assemblage of forms with their recent allies brings one to the same conclusions as were reached* by the study of those first obtained. All come from the same horizon and several are found in more than one locality, but none of the elytra from the Don Valley, where the other remains indicate a warmer climate than the present, were determinable. The Coleoptera from this Scarborough horizon indicate a climate closely resembling that of Ontario to-day, or perhaps a slightly colder one, a considerable proportion of their present allies being known from a more northern habitat. Nevertheless a few of the species belonging to the present additions to the fauna find their apparently nearest allies in southern forms; these are, however, so few as to suggest the probability of a mistaken reference in these cases. One cannot fail, also, to notice that a large number of the allies of the interglacial forms are recorded from the Pacific coast. Taking the case as it stands, I can only repeat as a final conclusion what I said before, that on the whole, the fauna has a boreal aspect, though by no means so decidedly boreal as one would anticipate under the circumstances.

The Scolytid borings, the last species of the list, were recently placed in the hands of Dr. A. P. Hopkins, of Morgantown, W. Va., who is more conversant with American Scolytidae and their work than any other of our naturalists, and he has given me the results of his examination of them, which appear as an Appendix to this paper, illustrated by two plates drawn or photographed by him. He gives a closer determination of the affinities of the insect which made the borings than I could do, as I was unable to make a definite generic reference.

In conclusion, I must express my indebtedness to Mr. Samuel Henshaw of Cambridge, who has kindly given me the statistics of the distribution of the existing beetles with which I have compared the fossils, and through whom I have had access to the LeConte collection of Coleoptera in the Museum of Comparative Zoology for purposes of comparison,—an invaluable opportunity; and to Professor J. W. Folsom of Antioch College, who, when living in Cambridge, made for me a preliminary comparison of most of the fossils with the same extensive museum series at great pains and expense of time and with much enthusiasm, thus greatly lightening my final work; I am glad to be able to add that his determinations in nearly all cases agreed very closely with my own, and rendered the accuracy of what may be regarded as in some sense our joint work more probable.

* See p. 28 of the present volume.

CARABIDAE.

Loricera exita sp. nov.

Pl. VI., Fig. 1.

Represented by a single nearly complete elytron, the central portion obscured by clay which will not bear removal without injury to the specimen. The humerus is very gently rounded, and there are seven rather deeply impressed, very feebly punctate striæ, with the intervals nearly flat; the whole is of a dead black colour. It comes near *L. 10-punctata* Esch., but the striæ are less heavily punctate than in any of our species of Loricera; the fourth interval shows, just before the place where it is obscured by clay, signs of a cross-line connecting the third and fourth striæ, such as is found in *L. 10-punctata*, but this is not shown in the figure. The length of the fragment is 3·2 mm, and its breadth 1·55 mm; the probable length of the elytron is 3·8 mm.

One specimen: No. 16813, Scarborough.

L. 10-punctata is found on the Pacific Coast from Alaska to California.

Nebria abstracta sp. nov.

Pl. VI., Fig. 2.

The basal half of an elytron represents a species of Nebria allied to *N. carbonaria* Esch. It is piceous, with well rounded humerus, a brief humeral stria and seven well impressed, distinctly punctate striæ, besides the marginal stria, with fewer but stout puncta; the intervals are nearly flat. It differs from *N. carbonaria*, to which it is closely allied, by its slightly smaller size, the more pronounced puncta of the marginal stria near the shoulder, the rather flatter intervals, and the more pronounced punctuation of the striæ generally. The length of the fragment is 2·6 mm, its breadth 1·6 mm; the probable length of the elytron is 5·5 mm.

One specimen: No. 16805, Reservoir Park, Toronto.

N. carbonaria is known only from Alaska.

Bembidium haywardi sp. nov.

Pl. VI., Fig. 3.

A single complete elytron represents a species apparently falling in the *coxendix* group and of slender form. The humerus is rounded subangulate, rather than rounded as appears in the figure (due to the point of view from which it was drawn), the striæ are entire though obscure at

the very apex, the third interval as wide as the others, and with two small dorsal punctures, one a little behind the middle, the other about one-fourth from apex, neither shown in the drawing. It seems to be most nearly allied to *B. sculpturatum* Motsch., but is a little smaller and slenderer, the striæ a little less impressed, the puncta more delicate, and the intervals a little less convex. It measures 4^{mm} in length by 1^{mm} in breadth.

One specimen: No. 16794, Logan's brickyard, Toronto.

B. sculpturatum was described from Alaska, and according to Hayward, occurs also in California.

The species is named for Mr. Roland Hayward, whose careful revision of the American species of Bembidium has been of much service in the study of these fossils.

Bembidium vestigium sp. nov.

Pl. VI., Fig 4.

Represented by the larger and proximal part of an elytron, piceous, with subangulate humerus, well impressed and rather delicately punctate striæ and flattened intervals, the third interval of a similar width to the others and showing a single dorsal puncture, not given in the drawing, just before the fracture, or probably distinctly beyond the middle of the elytron. It appears to be most nearly allied to *B. robusticolle* Hayw., the flatness of the intervals, the impression of the striæ and their punctuation being very much as in that species, besides being of about the same size; but the first dorsal puncture lies further back, and the first three striæ are more deeply impressed than the others, while all are alike in the existing species. The length of the fragment is $3{\cdot}2^{mm}$, and the probable length of the elytron 5^{mm}; its breadth $1{\cdot}5^{mm}$.

One specimen: No. 16808, Scarborough.

B. robusticolle is reported from Michigan, Iowa and Kansas.

Bembidium vanum sp. nov.

Pl. VI., Fig. 5.

Represented by two elytra, neither quite perfect, one lacking the distal fourth, the other being a little broken both at base and apex; apparently with the two preceding belonging to one group. The humerus is hardly subangulate but strongly rounded, the striæ not very deeply impressed, but somewhat heavily punctate, the intervals nearly flat; the third interval is of similar width to the others and shows the first dorsal

puncture, not given in the figure, distinctly before the middle of the elytron; the second cannot be seen on either specimen from the irregularity of the surface. Both elytra are piceous and appear of rather tenuous structure. The species seems to fall near *B. corendix* Say, but is a little larger, and has a little less deeply impressed striæ, though equally heavily punctate, and the first dorsal puncture is further forward. The better fragment measures 2·8 mm. in length and the whole elytron was probably 3·6 mm long; its breadth 1·2 mm.

Two specimens: No. 16795 from Scarborough; and No. 16807 from Reservoir Park, Toronto.

Hayward states that *B. corendix* occurs in Manitoba, Lake Superior, Illinois, Nebraska, Kansas, Colorado, New Mexico and Texas.

Bembidium praeteritum sp. nov.

Pl. VI., Fig. 6.

A single elytron, broken at the apex, represents a small and slender species with rounded humerus, moderately impressed and rather heavily punctate striæ, tolerably flat intervals and with two punctures in the third stria. It appears to be rather near *B. longulum* LeC., but is considerably smaller, with less deeply impressed striæ, considerably coarser punctures, flatter intervals, and the dorsal punctures differently placed, being a trifle less than one-third and two-thirds from base. I find no existing species that appears to come nearer to it. The length of the fragment is 2·1 mm, and the probable length of the elytron 3 mm; its breadth 0·8 mm.

One specimen: No. 16828, Scarborough.

B. longulum is said by Hayward to occur in the Lake Superior region, the mountainous parts of Wyoming, Colorado and Utah, and in California and Washington.

Bembidium expletum sp. nov.

Pl. VII, Fig. 1.

The larger portion of a much broken elytron indicates a species of about the same size as, or slightly larger than, *B. planatum* LeC., to which it appears to be most nearly allied. It has very delicately impressed, delicately and feebly punctate striæ and flat intervals, with a dorsal puncture on the third striæ (not shown in the figure) just before the end of the fragment, further back than in *B. planatum* and not so pronounced; the punctuation of the striæ is a trifle more distinct, and the striæ are similarly impressed throughout, and not more pronounced in the proxima

half of the elytra, as appears to be the case in *B. planatum*, at least on the first three striæ. The length of the fragment is 3·1mm, indicating an elytron about 5mm long; breadth 1·7mm.

One specimen: No. 16812, Reservoir Park, Toronto.

B. planatum occurs, according to Hayward, in the Lake Superior region, the Rocky Mountains as far south as Colorado, and in Nevada, Oregon, Washington and British Columbia.

Bembidium damnosum sp. nov.

Pl. VII, Fig. 5.

A nearly perfect but rather poorly preserved elytron represents a small species with rounded humeri, which appears to approach rather closely *B. complanulum* Mann., having similar flatness of intervals and much the same striation, though with feeblest signs of any punctuation; only one dorsal puncture can be made out on the third stria, not shown in the figure, and that is at the middle of the elytron. The length of the elytron as preserved is 2·5mm; it must have measured about 2·7mm, and the breadth is 0·9mm.

One specimen: No. 16827, Scarborough.

B. complanulum is said by Hayward to occur "on the Pacific coast from Alaska to California, extending eastward to the Rocky Mountains."

Patrobus decessus sp. nov.

Pl. VII, Fig. 4.

A number of specimens of the elytra of this species have been found, none of them perfect, though some nearly so; one with the best surface, though more imperfect than some of the others, was chosen for drawing. The elytra are piceous, about three times as long as broad, with well rounded humeri, flat intervals, delicate but sharply defined punctate striæ, the punctures distinct but delicate, and a sutural stria more than as long as the breadth of the elytra. They appear to represent a species of Patrobus allied to *P. rugicollis* Rand., but a little smaller and with more distinct punctures, though these are somewhat exaggerated in the drawing; the intervals are also flatter, and the surface is more glistening. Length of most perfect specimen 5·25mm; breadth, 1·75mm.

Ten specimens: Nos. 16782, 16783, 16787, 16788, 16791, Reservoir Park, Toronto; Nos. 16784–16786, 16789, 16790, Scarborough.

P. rugicollis is found in Canada, New England, New York and Pennsylvania.

Patrobus frigidus sp. nov.

Pl. VII, Fig. 6.

A nearly complete elytron with only the tip broken represents apparently another species of Patrobus, in which the elytron is about three times as long as broad, dark chocolate brown, profusely and minutely punctate throughout with pallid dots having a reddish tinge, the humerus well rounded, the striæ well defined but not deeply impressed, rather obscurely and minutely impresso-punctate, the intervals faintly convex. It does not appear to be very close to any of our living species, but nearest perhaps to *P. rugicollis* Rand.; the convexity of the intervals is much as in that species, as is also the punctuation of the striæ, but this is a little more pronounced in the fossil, which is also a little smaller than *P. rugicollis*; the profuse punctuation in the colouring is quite peculiar. Length of fragment, 4·8mm; length of restored elytron, 5·2mm; breadth, 1·75mm.

One specimen: No. 16793, Reservoir Park, Toronto.

Pterostichus abrogatus.

Pterostichus abrogatus Scudd., Tert. Ins. N.A., 525, pl. I, fig. 39 (1890).

Two additional specimens have been found: No. 16779 from Scarboro; and No. 16781 from Reservoir Park, Toronto.

Pterostichus dormitans.

Pterostichus dormitans Scudd., Tert. Ins. N.A., 526, pl. I, figs. 49, 55 (1890).

The original locality for this species was near Cleveland, Ohio; a specimen, No. 16802, is now found at Scarborough.

Pterostichus fractus.

Pterostichus fractus Scudd., Tert. Ins. N.A., 527, pl. I, figs. 29, 30 (1890).

An additional specimen, No. 16792, was found at Scarborough.

Pterostichus destructus.

Pterostichus destructus Scudd., Tert. Ins. N.A., 527, pl. I, fig. 46 (1890).

An additional specimen, No. 16801, occurs among the material from Reservoir Park, Toronto.

Pterostichus depletus sp. nov.

Pl. VII., Fig. 3.

A slender elytron, of which the apical third is gone, represents, apparently, a species of Pterostichus near *P. hudsonicus* LeC. The eight striæ are delicately impressed and very finely punctate, the intervals flat and the sutural stria meets the first, from which it is rather narrowly separated, at a distance equal to less than half the basal width of the elytron. It is of a dead black colour, more so than *P. hudsonicus*, and it farther differs from that species in that all the striæ are equally impressed, instead of having the lateral striæ subobsolete. The length of the preserved portion is $2{\cdot}65^{mm}$, indicating an elytron about 4^{mm} long; and its width is $1{\cdot}5^{mm}$.

One specimen: No. 16809, Scarborough.

Badister antecursor sp. nov.

Pl. VII., Fig. 2.

All but the apical fourth is preserved of an elytron which is, or was, a little more than two and a half times as long as broad, with eight well impressed impunctate dorsal striæ, besides two deeply impressed striæ on the deflexed marginal portion, closely approximate, the ninth with a couple of puncta well separated; the humerus is strongly rounded, and between the first and second striæ at the base, is a supplementary stria, subcontinuous with the distal portion of the first stria, and more than half as long as the width of the elytron; a single one of the dorsal puncta of the third interval may be seen at about one third the distance from the apex of the elytron, but is not shown in the figure; the intervals are flat and show an irregular, exceedingly fine cross striation. It seems to be nearly allied to *B. anthracinus* LeC.; but is slightly smaller, not so piceous, the striæ more sharply defined but yet not so deep, and it differs further in the character of the supplementary stria and the cross striation. The fragment measures 3^{mm} in length; the elytron was probably $3{\cdot}4^{mm}$ long, and is $1{\cdot}35^{mm}$ in breadth.

One specimen: No. 16817, Logan's brickyard, Toronto.

B. anthracinus is found in California, Oregon and Vancouver Island.

Platynus exterminatus sp. nov.

Pl. VIII., Fig. 3.

A single elytron with the apical fourth lost represents a species closely allied to *P. pusillus* LeC. The striæ are deeply impressed and very feebly

punctate, the sutural stria of moderate length, running from the base of the second stria to the first and about as long as half the basal breadth of the elytron, the puncta of the proximal part of the marginal stria pronounced; the intervals are shallowly convex. In shape, striation and punctuation it much resembles *P. pusillus*, but it is piceous, the punctuation is slighter, while the marginal puncta are more pronounced, the intervals are flatter, and the sutural stria is quite different. The length of the fragment is 3.1mm, its breadth 1mm, and the probable length of the elytron 4mm.

One specimen: No. 16803, Scarborough.

P. pusillus occurs in Canada, New England, Illinois and Missouri.

Platynus interglacialis sp. nov.

Pl. VIII, Fig. 2.

The basal half or thereabouts of an elytron is all that remains of this species. It shows a piceous flat field with delicately impressed impunctate striæ, a moderate free sutural stria, and the first stria arising close to the base of the second. It is perhaps nearest, though not very close, to *P. moerens* Dej., but it is a smaller species, the elytra probably not above 5mm long, of a more delicate texture and of a different colour. The length of the fragment is 3mm, and the width of the elytron 1·8mm.

One specimen: No. 16773, Scarborough.

P. moerens is reported from Canada, New York, Pennsylvania and Louisiana.

Platynus interitus sp. nov.

Pl. VIII, Fig. 4.

A bronze-green imperfect elytron preserves all the basal parts and shows eight strongly impressed impunctate striæ on a flat ground, the sixth to eighth striæ not reaching the base, the first stria bent angularly to make room for the sutural stria and arising not far from the base of the second stria: the sutural stria is short and likewise does not reach the base. It seems to be intimately allied to *P. cupreus* Dej., differing mainly in the arrangement of parts about the sutural stria, which is widely separated basally from the first stria; it has not the cupreous colour of specimens of *P. cupreus* from Hudson Bay Territory, but agrees very nearly in colour with specimens from Lake Superior described as *P. protractus* by LeConte. I am inclined to believe the fossil distinct. The fragment is 3·6mm long, and 1·7mm broad; the complete elytron would probably be 5mm long.

One specimen: No. 16771, Reservoir Park, Toronto.

P. cuprens is registered from Lake Superior, Michigan, Minnesota, Nebraska, Kansas, Colorado, Wyoming and Nevada.

Platynus longaevus sp. nov.

Pl. VIII, Fig. 1.

This is a similar fragment to the last and is also most nearly allied to *P. cuprens* Dej. It shows similar impunctate striæ on a flat field, but the striæ are less deeply impressed than in the last species and the colour is piceous; the sutural stria is moderate and scarcely inteferes with the basal course of the first stria, which at base is midway between the sutural stria and the second. The elytron is considerably slenderer than in *P. cuprens*, has a longer sutural stria and is of a different colour. The length of the fragment is 4·75^{mm}, and the probable length of the elytron 5·2^{mm} its breadth. 1·75^{mm}.

One specimen: No. 16772, Scarborough.

Platynus halli.

Platynus halli Scudd., Tert. Ins. N. A., 520–521, pl. I., fig. 41 (1890.)

Several more specimens of this species have been found: Two, Nos. 16774, 16776, from Scarborough; and two, Nos. 16777, 16778 from Logan's brickyard, Toronto.

Platynus desuetus.

Platynus desuetus Scudd., Tert. Ins. N. A., 521–522, pl. I., figs. 43, 51, 58 (1890).

A couple more specimens have been found: No. 13796, from Scarborough; and No. 16797 from Reservoir Park, Toronto.

Harpalus conditus sp. nov.

Pl. VIII., Fig. 5.

An almost perfect elytron shows close resemblance to *H. vulpeculus* Say. It is dead black with nearly rectangular humerus and eight striæ, besides a moderately long sutural stria, between the first and second, arising from the base of the second; the third and fourth striæ unite near the tip, and the fifth and sixth barely before them; the striæ are moderately impressed and very obscurely punctate, except the marginal stria

near the base, where the puncta are large and round, and not as shown in the figure, resembling closely the modern species named, as does the sutural stria; the other striæ differ, however, in being very obscurely punctate and the elytron is smaller and of a deader black. The length of the fragment is 4^{mm}, and the breadth $1{\cdot}6^{mm}$. The probable length of the elytron was 4^{mm}, the portion broken at the tip being hardly more than the basal portion before the striation.

One specimen: No. 16804, Scarborough.

H. vulpeculus occurs in Canada, New England, Pennsylvania and Missouri.

DYTISCIDÆ.

Coelambus derelictus sp. nov.

Pl. IX., Fig. 4.

The complete elytra of this species show a dense punctuation, a sharply defined sutural stria, a very delicately marginate outer border, and indicate a small and rather slender scutellum. It agrees fairly well with *C. dissimilis* Harr., but it is a little larger, and the punctuation is scarcely so delicate. Length 3^{mm}.

Two specimens: Nos. 16900, 16901, Scarborough.

C. dissimilis occurs at Lake Superior and in Massachusetts, New York and Illinois.

Coelambus cribrarius sp. nov.

Pl. IX, Fig. 3.

A single specimen, a nearly perfect right elytron, appears to come very close to *C. impressopunctatus* Sch., and is of much the same size and form. It is densely, conspicuously and finely punctate pretty uniformly over the whole elytron, but the punctuation is a little finer and denser than in the modern species, and there is no sign of a sutural stria or of the mid-elytral basal striæ. Length $3{\cdot}3^{mm}$.

One specimen: No. 16909, Logan's brickyard, Toronto.

C. impressopunctatus is found in Alaska, the Hudson Bay Territories and Lake Superior, as well as in Massachusetts, New York, New Jersey, Pennsylvania, Michigan and Illinois.

Coelambus infernalis sp. nov.

Pl. IX, Fig. 2.

Another species is represented by an elytron, from which much of the tip is broken. It also resembles, so far as punctuation is concerned, the

same species as the last, *C. impressopunctatus* Sch.; the punctuation is very similar though slightly more delicate in the fossil, but the slender shape is very different and the species is a smaller one. The outer edge is delicately marginate, but there is no sutural stria and the inner base is cut so angularly as to indicate a rather long and slender scutellum; the mid-elytral basal sulci of the modern species are indicated more distinctly than appears in the figure, requiring a different light to see at the best. Length of fragment, 2·35^{mm}; probable length of elytra, 2·6^{mm}.

One specimen: No. 16908, Reservoir Park, Toronto.

Coelambus disjectus sp. nov.

Pl. IX, Fig. 1.

Still a third species referable to Coelambus finds its nearest living counterpart in *C. impressopunctatus* Sch. It is a nearly complete but broken elytron, with a fine dense punctuation, a delicately margined outer border, and a distinct, sharp sutural stria. It is piceous and not dark chestnut in colour, and has finer, closer and shallower punctuation than in the living form. Length nearly 4^{mm}.

One specimen: No. 16899, Scarborough.

Hydroporus inanimatus sp. nov.

Pl. X, fig. 3.

A single elytron, somewhat crushed and broken, but practically perfect, appears to belong to Hydroporus, but represents a species considerably broader than any I have seen. It seems to come as near to *H. solitarius* Sharp as anything, but besides being much broader has considerably coarser and more distant punctuation. Exteriorly it is narrowly and delicately marginate, and the punctuation, though distinct and not very delicate, is rather shallow. Length 3^{mm}.

One specimen: No. 16903, Scarborough.

H. solitarius is only known from Massachusetts.

Hydroporus inundatus sp. nov.

Pl. X., Fig. 2.

The only relic of this species is a single perfect right elytron, showing a slender insect with a marginal stria, which hardly appears in the position from which the specimen was drawn (requiring light from the opposite side), and uniformly, rather sparsely and delicately punctate. It is, however, denser than appears by the figure, and denser than in *H. hum-*

eralis Aubé, which, of our living species, it appears most to resemble, and with which it agrees well in size and proportions. Length, 3mm.

One specimen: No. 16902, Logan's brickyard, Toronto.

H. humeralis is found in Alaska.

Hydroporus sectus sp. nov.

Pl. x., Fig. 1.

Two slender elytra, only one of which is perfect, represent a species of Hydroporus allied to *H. oblongus* Steph. The punctuation is delicate and rather dense (hardly shown as dense enough in our figure) and pronounced, and there is an obscure margination to the outer border. It is smaller than the modern species with which it is compared, and has a somewhat denser punctuation. Length 3·8 mm.

Two specimens: No. 16904, Reservoir Park, Toronto; No. 16905, Scarborough.

H. oblongus occurs in Europe and also in this country in Canada, Lake Superior, Michigan, and Vancouver Island.

Agabus perditus sp. nov.

Pl. ix., Fig. 5.

There are preserved two fragments of what appear to be the same species, referable to Agabus, one showing the basal half, the other the apical two-thirds of elytra, both showing a black surface which is microscopically rugulose (scarcely appreciable under a strong hand lens), with widely scattered obscure puncta and a marginate outer border; the humerus is square. It appears to be nearly related to *A. seriatus* Say, but it is wholly without the series of approximated punctures found in that species. The length of the basal fragment is 3·35mm, that of the apical 5mm; the probable length of the whole elytron perhaps 7·5mm.

Two specimens: Nos. 16898, 16906, Scarborough.

A. seriatus is found in Massachusetts, Pennsylvania, Colorado, Lake Superior and Canada.

GYRINIDAE.

Gyrinus confinis LeC.

Pl. x., Fig. 5.

Gyrinus confinis LeC., Proc. Acad. Nat. Sc. Philad., 1868, 368.

A single complete elytron of flattened, tapering, round-tipped form, a heavy sutural stria, distinctly marginate outer border, and with eleven

series of similar, circular or oval, approximate punctures, not shown as near together as they should be in the figure, cannot, so far as I can see, be distinguished from the modern species, whose name is given above. It is the only one of the interglacial beetles completely identical with a living species. Length 5mm.

One specimen : No. 16913, Scarborough.

G. confinis occurs in Massachusetts, Lake Superior, Montana and Oregon.

HYDROPHILIDAE.

Cymbiodyta exstincta sp. nov.

Pl. x., Fig. 4.

One excellently preserved specimen shows a right elytron quite complete, indicating a broad insect. The shape shows the presence of a rather large scutellum; the elytron is marked by a distinct, sharp sutural stria, and externally is very faintly and delicately marginate; it is about twice as long as broad, and the surface is profusely and most delicately punctate. It is referred, somewhat doubtfully, to Cymbiodyta, in the vicinity of *C. fimbriata* Melsh.; the punctuation is similar, though a little coarser than in the modern species, and the puncta do not merge into striæ at the extreme tip as in that; the proportions of the two are much the same, though the fossil is somewhat broader, and it is also a little smaller. Length, nearly 3mm.

One specimen ; No. 16912, Scarborough.

C. fimbriata occurs in Canada and in Massachusetts, Pennsylvania, Iowa and Texas.

STAPHYLINIDAE.

Gymnusa (?) absens sp. nov.

Pl. xi., Fig. 1.

A single elytron perhaps belongs to Gymnusa, and may be compared, though not very well, to *G. variegata* Kies. It is very short compared to its breadth and is nearly smooth and distinctly margined, not only next the suture, but to some extent at the posterior border, an unusual feature in any Staphylinid. The surface is castaneo-piceous, and instead of being, as in the modern species, minutely and profusely punctate, is very faintly, shallowly, and sparsely punctate; there is no sinus in the

posterior margin laterally and the lateral margination is as distinct as the sutural; the base is a little broken, but it is otherwise perfect. Length, 7^{mm}, breadth, 1·25^{mm}.

One specimen: No. 16873, Scarborough.

G. variegata is only known from Michigan.

Quedius deperditus sp. nov.

Pl. XL., Fig. 2.

A single left elytron, perfect but flattened so as to expose the whole of the lateral face, appears to represent a species of Quedius, not far removed from *Q. capucinus* Grav. It enlarges slightly from the base, the distal half of the sutural border is minutely margined, the lateral fold is sharply carinate and not blunt as in *Q. capucinus*, and the posterior margin squarely truncate but laterally strongly rounded; the surface is black with only a trace of castaneous and has a rather more abundant though still sparse punctuation as compared with the modern species. Length, 2^{mm}; breadth of dorsal surface, 0·9^{mm}.

One specimen: No. 16874, Scarborough.

Q. capucinus is reported from Alaska, Canada, Pennsylvania, Indiana and Missouri.

Philonthus claudus sp. nov.

Pl. XII., Fig. 1.

A species of Philonthus appears to be represented by a pair of elytra which are twice as long as broad, broaden slightly posteriorly, are profusely and deeply punctate, have the lateral plication sharp and slight, while the oblique truncation of the inner base indicates a rather large and long scutellum. They are of the same size and shape as in *P. aeneus* Rossi, which they approach more nearly than the other species, but the punctuation is distinctly coarser and deeper, and if anything more profuse. It is also dead black, instead of having a steely lustre. Length, 2·5^{mm}; breadth, 1·25^{mm}.

Two specimens: Nos. 16875, 16876, Scarborough.

P. aeneus is a cosmopolitan species, and in this country has been reported from the Hudson Bay Territories, Canada and Lake Superior and the Northern United States from Massachusetts to Colorado and Missouri.

Cryptobium detectum sp. nov.

Pl. XII., Fig. 2.

A single elytron, fully two and a third times longer than broad, broadest in the middle, the posterior margin squarely truncate but the inner apical angle obtusangulate, the surface very profusely and very delicately punctate, seems to be a Cryptobium, not very closely allied to *C. pallipes* Grav.; compared with which it has much more delicate, denser and less deeply impressed punctuation, and a relatively slenderer form. The single specimen is a little imperfect, a piece having gone from the outer apical angle, and the humerus is thrust forward with unusual prominence. Length, 2·6^{mm}; breadth, 1·1^{mm}.

One specimen: No. 16877, Scarborough.

C. pallipes is found in Canada and the northern United States from New England to Wisconsin, but also in Florida and Louisiana.

Cryptobium cinctum sp. nov.

Pl. XII., Fig. 3.

Another species of Cryptobium is represented by a couple of elytra from different localities, which seem to be nearly allied to *C. californicum* LeC. They are scarcely more than twice as long as broad, castaneo-piceous, slightly broader a little beyond the middle than elsewhere, the posterior margin faintly excavate, the inner apical angle feebly produced, and the surface coarsely and profusely punctate. Compared with the modern species mentioned, they are a little larger and broader, and the punctuation is hardly so sharp or so deep. Length, 2·4^{mm}; breadth, 1·15^{mm}.

Two specimens: No. 16878, Logan's brickyard, Toronto; and No. 16879, Scarborough.

C. californicum comes from Nevada, California, Oregon and Vancouver Island.

Lathrobium antiquatum sp. nov.

Pl. XI., Fig. 5.

A single elytron less than twice as long as broad, with the inner base cut to indicate a broad and short scutellum, seems to belong to Lathrobium, and may best be compared with *L. divisum* LeC. It broadens regularly though but slightly, has a very broadly rounded apical margin, and the surface profusely and rather minutely punctate. It lacks the distinct margination of the sutural border seen in *L. divisum*, with which

it agrees in size; the punctuation is rather coarser and heavier, and it is wholly black, instead of being apically ferruginous. Length, $2{\cdot}2^{mm}$; breadth, $1{\cdot}15^{mm}$.

One specimen: No. 16880, Logan's brickyard, Toronto.

L. divisum comes from Vancouver Island.

Lathrobium debilitatum sp. nov.

Pl. XI., Fig. 6.

This species is very closely allied to the last, from which it differs slightly in its proportions, its uniform breadth, and its piceous colour; its punctuation is very similar. It is also to be compared with the same modern species, from which it differs similarly and also in the proportions of the elytra which are considerably broader in proportion to the length. Length, 2^{mm}; breadth, $1{\cdot}2^{mm}$.

One specimen: No. 16881, Scarborough.

Lathrobium exesum sp. nov.

Pl. XI., Fig. 7.

Another species of Lathrobium is represented by a single elytron, about twice as long as broad, broadening faintly posteriorly, with marginate sutural border and sharply carinate lateral margination, the posterior margin rigidly truncate, the inner apical angle rectangulate, the outer strongly rounded, the surface uniform dark castaneous, and with moderately profuse sharp and delicate punctuation. It appears to be rather close to *L. nigrum* LeC.; it has the same proportions, but is slightly larger, and the punctuation is deeper, sharper and more profuse. Length, $2{\cdot}1^{mm}$; breadth of dorsal surface, $1{\cdot}1^{mm}$.

One specimen: No. 16882, Reservoir Park, Toronto.

L. nigrum is reported from Massachusetts and Lake Superior.

Lathrobium inhibitum sp. nov.

Pl. XI., Fig. 4.

This and the following species of Lathrobium have relatively much longer elytra than those above described, these being in the present species about a fifth more than twice as long as broad. The elytron broadens slightly posteriorly, has a truncate posterior margin, both apical margins rounded rectangulate, the sutural border delicately marginate in its distal half, the surface blackish castaneous, rather obscurely and some-

what profusely punctate. It appears to approach *L. divisum* LeC., but is a trifle larger, a little more densely and slightly more deeply punctured. Length, 2·65mm; breadth, 1·2mm.

One specimen ; No. 16883, Scarborough.

Lathrobium frustum sp. nov.

Pl. XI., Fig. 3.

The last species of Lathrobium falls in the near vicinity of *L. grande* LeC., and is represented by several elytra, which are about a third more than twice as long as broad, of almost uniform breadth, but scarcely broadening posteriorly, the posterior margin truncate, the inner apical angle rectangulate, the outer strongly rounded, with no margination of the sutural border ; the surface is piceous, profusely and delicately punctate. It agrees with the modern species mentioned in size, but the posterior border is squarely and in no way obliquely truncate, and the punctuation is more pronounced, slightly coarser and certainly deeper; nor is there any trace of castaneous in the coloring. Length 2.15 mm ; breadth 0·9mm.

Seven specimens: Nos. 16884–16889, Scarborough ; No. 16890, Logan's brickyard, Toronto.

L. grande is found from Nova Scotia to Lake Superior and North Carolina.

Acidota crenata Fabr., var. **nigra**, var. nov.

Pl. XII., Fig. 4.

Staphylinus crenatus Fabr., Ent. Syst., I, pars 2, p. 525 (1792).

A single left elytron, with puncta serially arranged, apparently represents the modern species *A. crenata* Fabr., but differs from it in that the colouring is dead black instead of dark castaneous, which all the modern specimens I have seen are, though they include some which LeConte described under the specific name *nigro-picea* ; the punctures also seem a little more pronounced, but the resemblance is so close that I do not venture to separate it from the modern form by more than a varietal distinction. Length, 2·2mm ; breadth, 1mm.

One specimen : No. 16891, Scarborough.

A. crenata occurs in Canada, Lake Superior, Michigan and Massachusetts.

Arpedium stillicidii.

Arpedium stillicidii Scudd., Contr. Can. Pal., II., 42, pl. II., fig. 2 (1892).

Two additional specimens, Nos. 16896, 16897, from Scarborough are found in the material sent by Professor Coleman.

Olophrum celatum sp. nov.

Pl. XII., Fig. 5.

A pair of elytra, a trifle less than twice as long as broad, of equal breadth, with truncate hind margin, but strongly rounded apical angles, delicately margined sutural border, the surface piceous and profusely and sharply punctate, represent a species of Olophrum allied to *O. convexum* Mäkl. The size and proportions are the same, but there is no castaneous in the colouring, and the punctuation in the fossil is a little closer and considerably more delicate. Length, $2{\cdot}2^{mm}$; breadth, $1{\cdot}2^{mm}$.

Two specimens: Nos. 16892, 16893, Scarborough.

O. convexum is found in Alaska.

Olophrum arcanum sp. nov.

Pl. XII., Fig. 6.

Another species of Olophrum is closely allied to the last, and may also be compared with the same modern type. It is slightly smaller and more slender than *O. celatum*, and the puncta are more shallow and less distinct. It is of a dull black colour. Length $2{\cdot}15^{mm}$; breadth, $0{\cdot}9^{mm}$.

One specimen: No. 16894, Scarborough.

Olophrum dejectum sp. nov.

Pl. XII., Fig. 7.

The last species of Olophrum differs considerably from the others in the much greater proportional length of the elytra which are about two and a half times longer than broad, with parallel sides, truncate apical margin, rectangulate apical angles, and the surface piceous at base, changing apically to blackish castaneous, the punctuation profuse and pronounced. It comes in the vicinity of *O. obtectum* Erichs., but is slen-

derer, with more angulate apical angles, a more truncate hind margin, and the punctuation less profuse and not so sharp. Length, 2·7mm; breadth, 1·1mm.

One specimen: No. 16895, Scarborough.

O. obtectum is reported from Canada, Massachusetts, Michigan, Pennsylvania and Missouri.

Curculionidae.

Erycus consumptus sp. nov.

Pl. xiii., Figs. 1, 2.

A single right elytron (Fig. 2) broken across the middle, but otherwise nearly perfect, except at the extreme tip, appears to be an Erycus. The ten striæ are deeply impressed, with profuse and deeper punctuation, the interspaces convex; the fourth and fifth striæ are the shortest and nearly unite at their tips, near the middle of the apical two-fifths of the elytron and near its middle line; the third and sixth unite somewhat beyond this. It appears to fall tolerably near *E. puncticollis* LeC., the striæ, their apical union, the puncta and the size agreeing well; but it differs in that the elytron does not narrow so much apically, and in that the interspaces between the striæ are much more convex. The length of the fragment is 3·2mm; probably the elytron was 3·6mm long; the breadth is 1·4mm.

One specimen: No. 16850, Scarborough.

With this I place the head and beak of another specimen (Fig. 1), found in a different spot, because by an independent examination of the large series of North American Curculionidae in the Museum of Comparative Zoology, I found no other species with which it corresponded closely but the same *E. puncticollis* LeC., and its size matches well. The beak is a trifle smaller than in the modern species, and not bent as there at the insertion of the antennæ, while the head proper is distinctly larger and more rotund. The sculpturing is very similar as well as the general shape, the obliteration of the markings behind the eye indicating a similar covering by a lobe of the pronotum. Length of beak from base of antennal scrobes, 1·8mm.

One specimen: No. 16866. Logan's brickyard, Toronto.

E. puncticollis is found about Lake Superior and in the Middle and Western United States.

Anthonomus eversus sp. nov.

Pl. XIII., Fig. 6.

A number of perfect or nearly perfect elytra, with ten punctate striæ at subequal distances apart, the outer and the inner three uniting near the apex, and within them the fourth uniting or almost uniting with the fifth, and the sixth with the seventh, a little outside the middle line of the elytron and near the middle of its apical two-fifths. The striæ are well impressed and the puncta circular and closely approximated, while the interspaces between the striæ are convex. The species seems to be very close to *A. ater* LeC.; the apical arrangement of the striæ is the same, but it is a little smaller, the punctuation is a little more pronounced and distinct, and the striæ are deeper; the difference is not great, but seems to be sufficient to distinguish them specifically. The puncta are too feebly drawn in the figure and are not so closely approximated as they should be. Length of elytron $3{\cdot}3^{mm}$; breadth $1{\cdot}5^{mm}$.

Ten specimens: Nos. 16852–16858, 16860, 16869, Reservoir Park, Toronto; and No. 16859, Logan's brickyard, Toronto.

A. ater occurs in California.

Anthonomus fossilis sp. nov.

Pl. XIII., Fig. 7.

Other elytra, some of them quite perfect, smaller than the last species, have a very similar arrangement of the striæ, but they are more crowded together on the outer half or third of the elytron and do not unite so distinctly at apex; the striæ are deeply impressed and the puncta coarse—unusually so for an Anthonomus. The species appears to resemble *A. nigrinus* Boh., but not very closely; the elytron is considerably larger and perhaps broader; the apical arrangement of the striæ is much the same, but the striæ are considerably more deeply impressed, and the puncta are much larger, deeper and coarser. Length, $2{\cdot}4^{mm}$; breadth $1{\cdot}15^{mm}$.

Ten specimens: Nos. 16844, 16845, 16862–16864, 16868, Reservoir Park, Toronto; Nos. 16846, 16847, Scarborough; and Nos. 16848 16849, Logan's brickyard, Toronto.

A. nigrinus is reported from Georgia and Louisiana.

Anthonomus lapsus sp. nov.

Pl. XIII., Fig. 5.

In a third species of Anthonomus the elytron is a little larger than in *A. disjunctus* LeC., with which it can best be compared, though the relation is not very close. There is the same flatness of the interspaces, but the striæ are broader with more sloping sides, while the puncta are a little larger and more distinctly impressed. The elytron is piceous, 3^{mm} long, and $1{\cdot}2^{mm}$ broad.

One specimen: No. 16861, Reservoir Park, Toronto.

A. disjunctus is found in Illinois and Georgia.

Orchestes avus sp. nov.

Pl. XIII., Fig. 4.

A complete right elytron of great relative breadth seems to belong to Orchestes. The two outer and two inner striæ unite apically and another pair of loops within them is formed by the third and sixth, and by the fourth and fifth striæ, while besides these the seventh and eighth striæ are united apically at about the middle of the distal third of the elytron. The striæ are rather coarse and well pronounced, but the puncta are relatively obscure. The whole is dead black. It seems to be rather closely related to *O. niger* Horn, but in this species the fourth stria from the suture unites with the third, and the whole apical arrangement of the striæ becomes thereby different. The fossil is a trifle larger but of the same form, the striæ less deeply impressed and the puncta more obscure. The length is $1{\cdot}8^{mm}$, and the breadth $0{\cdot}9^{mm}$.

One specimen: No. 16867, Logan's brickyard, Toronto.

O. niger is known to occur in Nova Scotia, Canada, Illinois and California.

Centrinus disjunctus sp. nov.

Pl. XIII., Fig. 3.

The basal half or less of an elytron shows ten nearly straight delicate striæ, with delicate punctuation and flat punctate interspaces, all of which closely resembles the appearance of *C. calvus* LeC. It is of about the same size apparently, and differs in being piceous and not castaneous,

and in having distinctly finer and more delicate striæ, which are also a little shallower; the puncta in the striæ are similarly obscure, but the punctuation of the interspaces more profuse and more delicate. The length of the fragment is 1·8^{mm}, and the breadth, 1·3^{mm}; the real length of the elytron may have been nearly 4^{mm}.

One specimen: No. 16865, Reservoir Park, Toronto.

C. calvus occurs in Georgia and Florida.

APPENDIX.

Work of the prehistoric scolytid, Phloeosinus squalidens Scudd. By A. D. Hopkins, Entomologist of the West Virginia Agricultural Experiment Station. (Plate xiv., xv.)

The work of this prehistoric Scolytid* is of especial interest, and with the large series of Scolytid work in our collection, and that recently collected in the North-west, (mentioned in Bulletin 21, n.s., Div. Ent., U. S. Dept. Agriculture), I have been able to obtain some additional information regarding the wood, the galleries and the generic position of the beetle.

A microscopic examination of the wood fibre in comparison with that of *Juniperus virginiana*, Larix, Picea, Chamaecyparis, Thuja, Thuga, Pseudotsuga, Sequoia and Abies, seems to warrant the conclusion that it comes nearer to Thuja than to any of the other specimens with which it was compared, yet not having compared it with *Juniperus communis*, I would hesitate to say that it is not this species, as determined by Dr. Goodale.

If, as seems quite certain, it is cedar, (either Juniper or Thuja), the work must be that of Phloeosinus, and from a careful comparison with the work of three existing species of this genus it is found to come very close to *Phloeosinus punctatus* LeC., in *Thuja plicata* and *Chamaecyparis lawsoniana*. (Pl. xiv., Fig. 3.)

The species of this genus seem to infest only the Cupresseae and Taxodieae. *P. dentatus* Say has long been known as the common enemy of the eastern Junipers, and I have also found it in *Thuja occidentalis* at Niagara Falls. I have also found *P. punctatus* to be a common enemy of Thuja, Libroceдrus and Chamaecyparis in California and Oregon; *P. cristatus* LeC., common in *Sequoia sempervirens*, and three apparently undescribed species, one in *Cupressus macrocarpa*, one in *Sequoia sempervirens* and the other in a Cryptomiuia sp., all in California. Two European species in our collection from the late W. Eichhoff, *P. aubei* and *P. thujae*, were both collected from *Juniperus communis*, and are also recorded from Thuja.

The "shark's tooth" form of the mating or nuptial chambers is the characteristic normal form of that of all of the species so far as has been observed. There is, however, considerable difference in the size, form and position of the primary, or egg, galleries. Those of *P. dentatus* (figs.

* See a previous paper in this series, pp. 28-30. —S.H.S.

6 and 7) and *P. cristatus* (fig. 8 and 9) are almost identical in form, differing only in size. Both are normally straight and excavated longitudinally in the bark and surface of the wood, while those of *P. punctatus* (figs. 3 to 5) are seldom straight and are excavated obliquely or transversely through the bark and wood, and are often found with one wing of the nuptial chamber extended to accommodate a second female, agreeing almost exactly in this respect with that of the interglacial species.

The genus Phloeosinus is represented by three or four described species from Europe, one from the Himalayas, seven from Japan, one from Mexico, one from Guatemala and four or five from America north of Mexico. There are also several undescribed species that I have observed, in collections, recorded from Texas, Colorado and Canada. I consider this genus one of the oldest survivors of the Hylesinides group. It is not improbable that it reached its maximum development during the Cretaceous period, and that its representatives were then common enemies of the several species of Sequoia, Juniperus, Libroedrus, etc., having descended probably with little change in habit or structure, and shared with their surviving host plants the vicissitudes of the great and minor surface disturbances and climatic changes from the Mesozoic to and through the Cenozoic to the present.

Therefore, the exclusive association of the surviving species of this ancient genus of beetles with the survivors of a number of ancient genera of Cupresseae and Taxodieae is of especial interest, since it seems to present some evidence of a closer natural relationship between these groups than has heretofore been recognized. Especially is this indicated in the fact that one or more species infest the Sequoia, one of the oldest representatives of the Taxodieae, and that so far none have been found to infest Pinus, Picea or Abies, with which the Taxodieae are thought by botanists to be more closely allied than to the C[illegible]ae.

It seems quite important that an effort should be [illegible] to obtain more material from the buried interglacial and other forests and fossil wood, showing the work of insects, since it would lead to the determination of some interesting and important facts regarding the habits of prehistoric forms and their relation to primeval forest trees.

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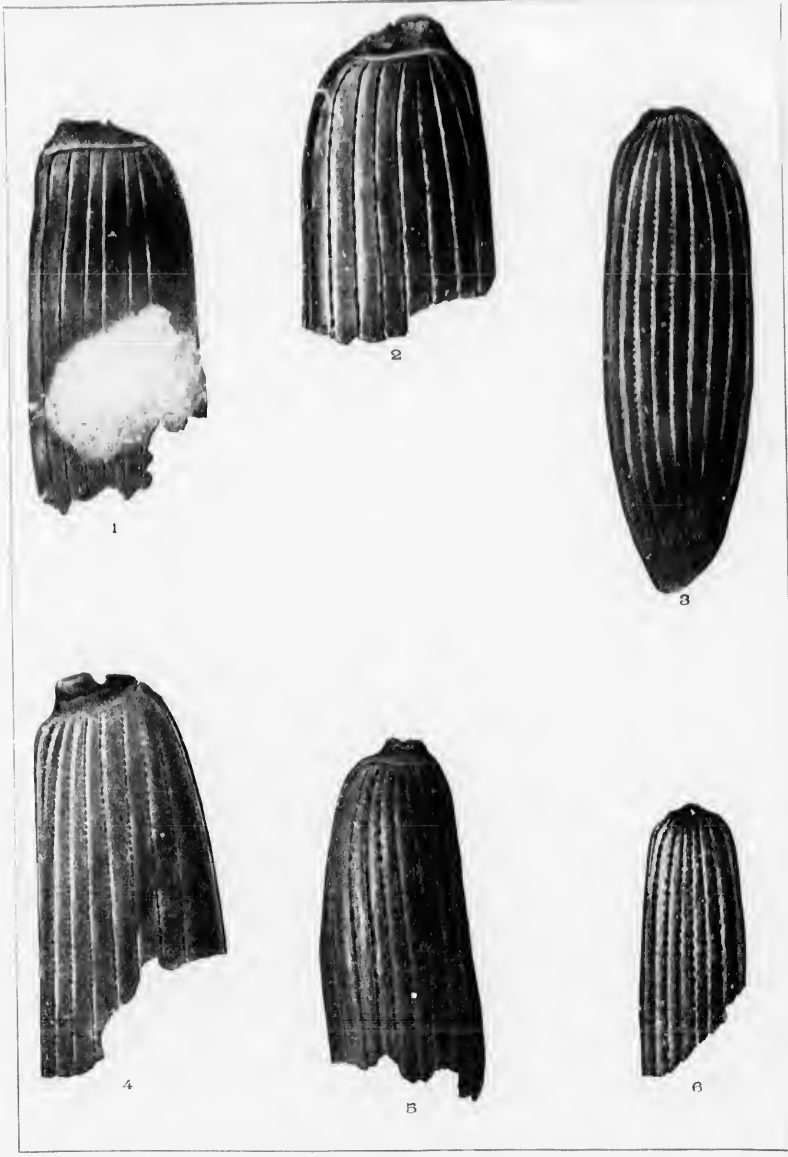
PLATE VI.

CARABIDAE.

All the figures are by J. Henry Blake and are magnified twenty diameters.

Fig. 1. (16813) Loricera exita.
2. (16805) Nebria abstracta.
3. (16794) Bembidium haywardi.
4. (16808) Bembidium vestigium.
5. (16795) Bembidium vanum.
6. (16828) Bembidium praeteritum.



diameters.

PLATE VII.

Carabidae.

All the figures are by J. Henry Blake and are magnified twenty diameters.

Fig. 1. (16812) Bembidium expletum.
2. (16817) Badister antecursor.
3. (16809) Pterostichus depletus.
4. (16782) Patrobus decessus.
5. (16827) Bembidium damnosum.
6. (16793) Patrobus frigidus.

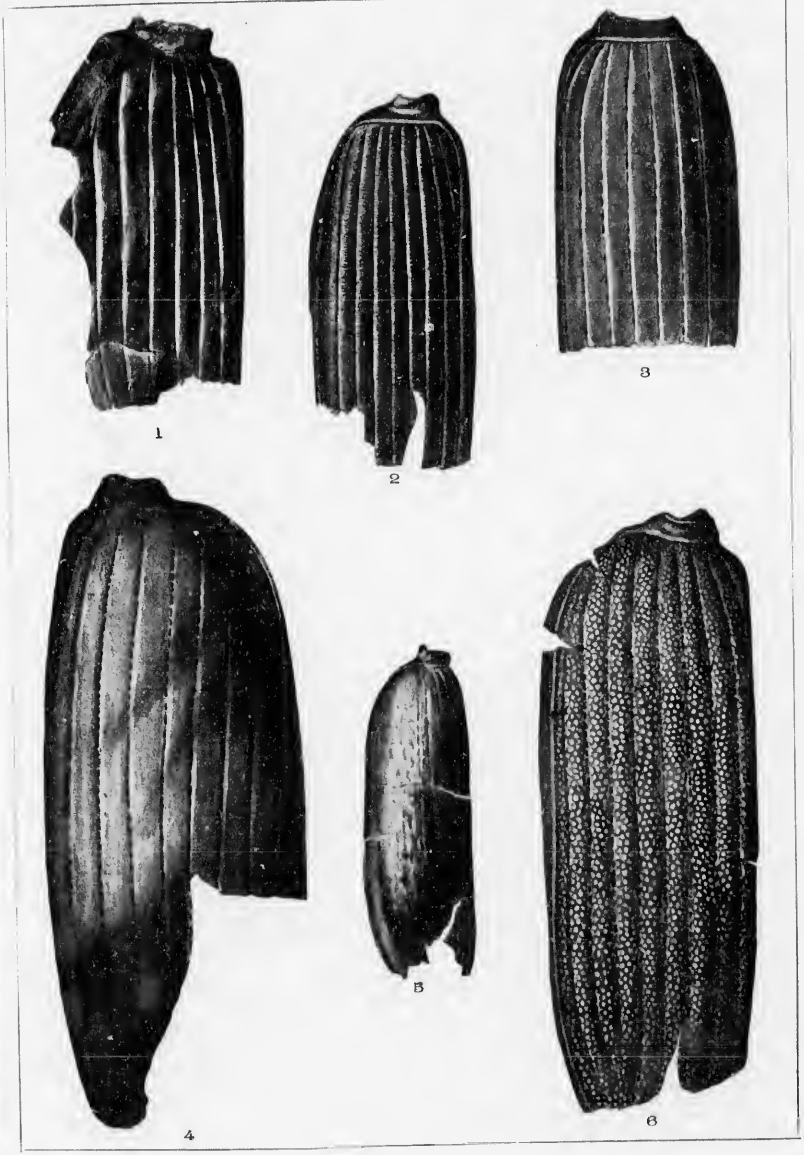


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PLATE VIII.

Carabidae.

All the figures are by J. Henry Blake and are magnified twenty diameters.

Fig. 1. (16772) Platynus longaevus.
2. (16773) Platynus interglacialis.
3. (16803) Platynus exterminatus.
4. (16771) Platynus interitus.
5. (16804) Harpalus conditus.

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CONTR. TO CAN. PAL. VOL. II. PLATE VIII

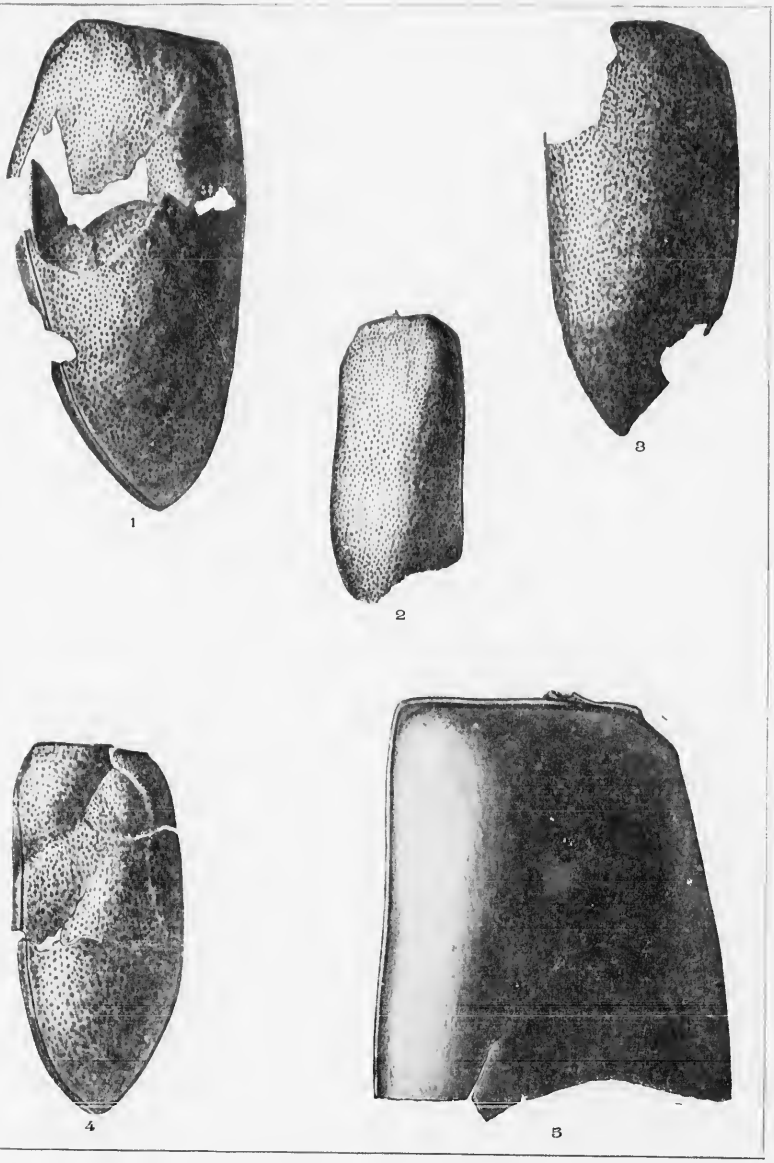
y diameters.

PLATE IX.

Dytiscidae.

All the figures are by J. Henry Blake and are magnified twenty diameters.

Fig. 1. (16899) Coelambus disjectus.
2. (16908) Coelambus infernalis.
3. (16909) Coelambus cribrarius.
4. (16901) Coelambus derelictus.
5. (16898) Agabus perditus.



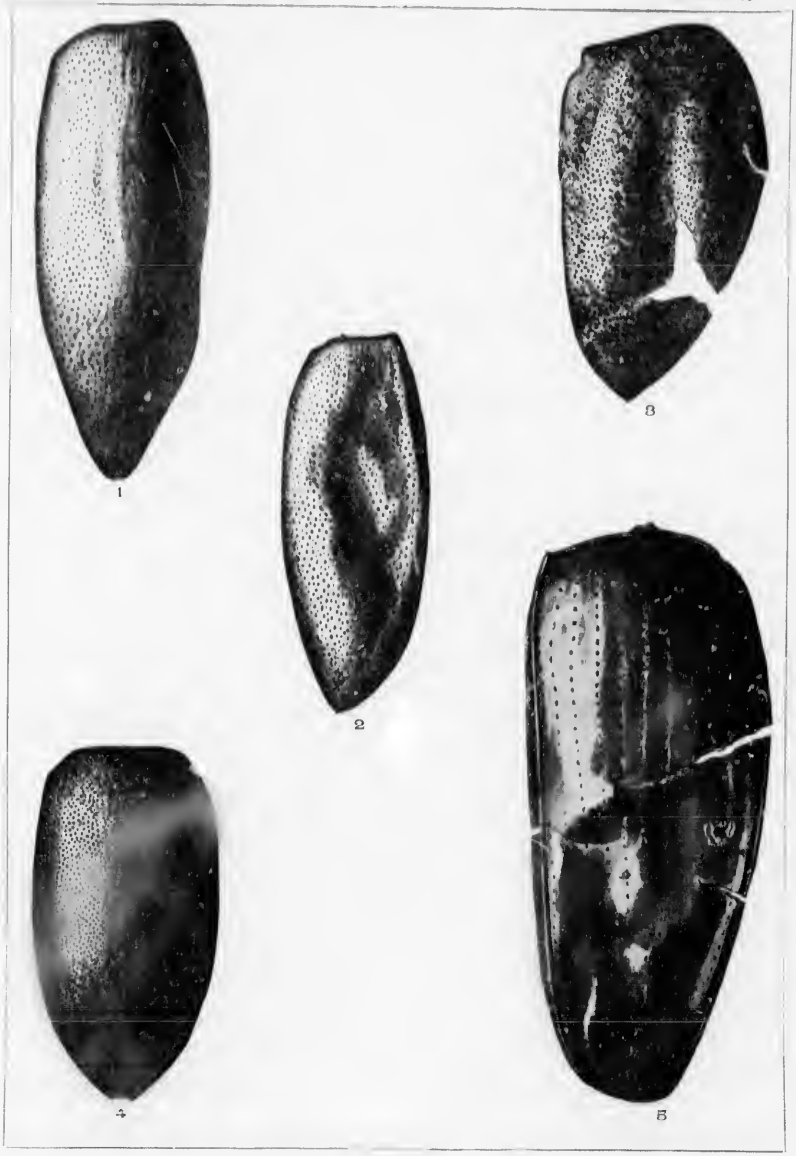
venty diameters.

PLATE X.

DYTISCIDÆ, GYRINIDÆ, HYDROPHILIDÆ.

All the figures are by J. Henry Blake and are magnified twenty diameters.

Fig. 1. (16905) Hydroporus sectus.
2. (16902) Hydroporus inundatus.
3. (16903) Hydroporus inanimatus.
4. (16912) Cymbiodyta exstincta.
5. (16913) Gyrinus confinis LeC.



IDÆ.

ed twenty diameters.

PLATE XI.

Staphylinidae.

All the figures are by J. Henry Blake and are magnified twenty diameters.

Fig. 1. (16873) Gymnusa absens.
2. (16874) Quedius deperditus.
3. (16884) Lathrobium frustum.
4. (16883) Lathrobium inhibitum.
5. (16880) Lathrobium antiquatum.
6. (16881) Lathrobium debilitatum.
7. (16882) Lathrobium exesum.

Geological Survey of Canada.

CONTR. TO CAN. PAL. VOL. II. PLATE XI

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twenty diameters.

PLATE XII.

STAPHYLINIDAE.

All the figures are by J. Henry Blake and are magnified twenty diameters.

Fig. 1. (16875) Philonthus claudus.
2. (16877) Cryptobium detectum.
3. (16878) Cryptobium cinctum.
4. (16891) Acidota crenata Fabr., var. nigra.
5. (16892) Olophrum celatum.
6. (16894) Olophrum arcanum.
7. (16895) Olophrum dejectum.

Geological Survey of Canada.

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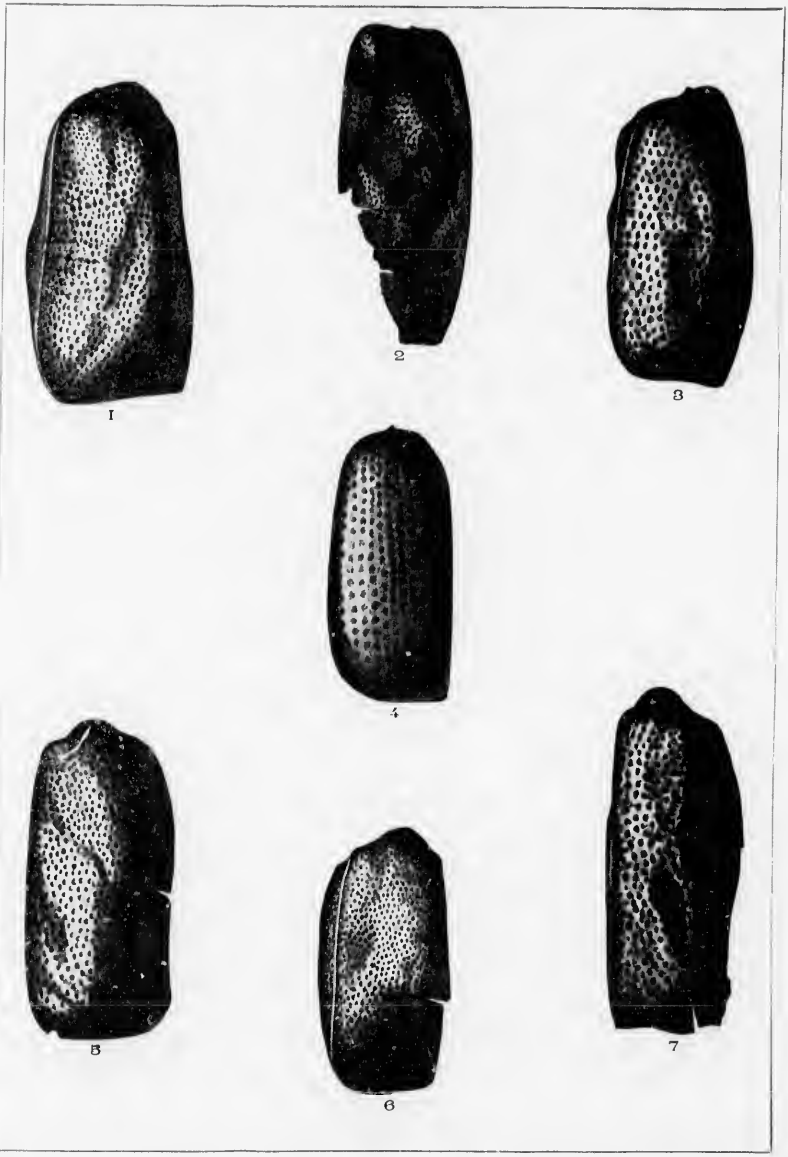
PLATE XII.



venty diameters.

PLATE XIII.

Curculionidae.

All the figures are by J. Henry Blake and are magnified twenty diameters.

Fig. 1. (16866) Eryeus consumptus (head).
2. (16850) Eryeus consumptus (elytron).
3. (16865) Centrinus disjunctus.
4. (16867) Orchestes avus.
5. (16861) Anthonomus lapsus.
6. (16852) Anthonomus eversus.
7. (16844) Anthonomus fossilis.

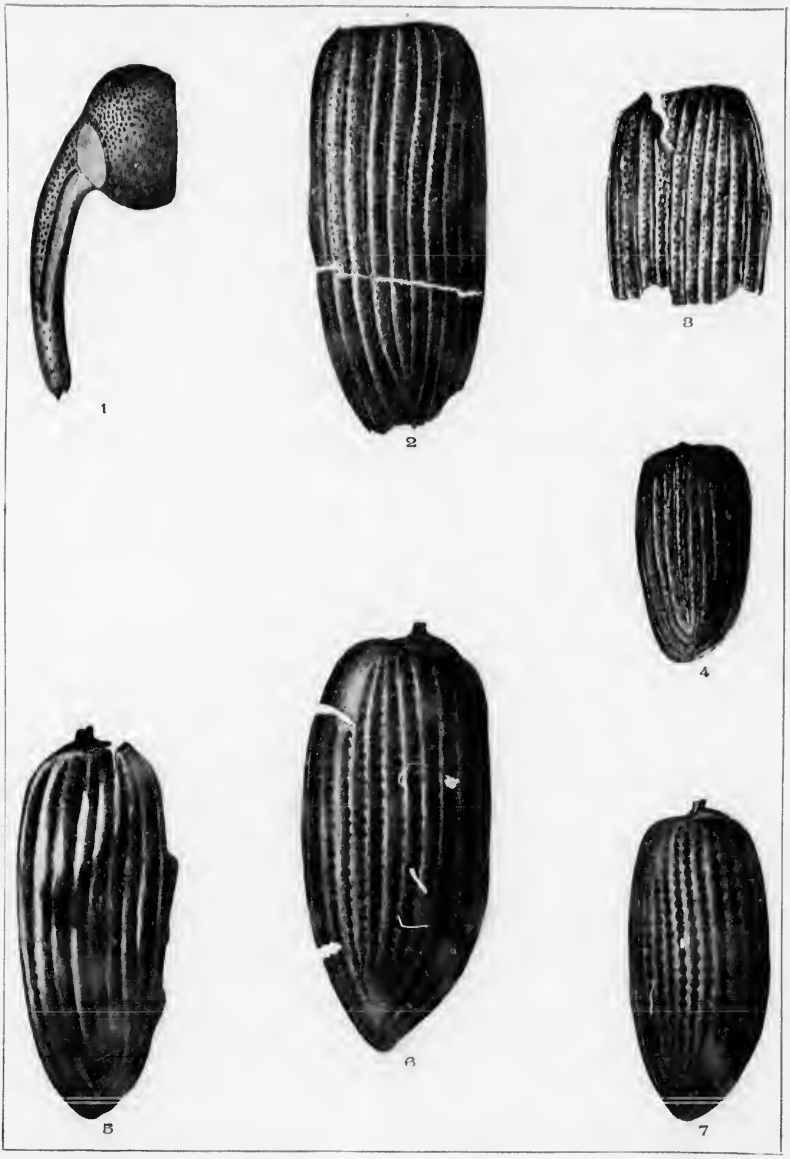

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PLATE XIV.

Borings of Scolytidae.

Drawn by A. D. Hopkins.

Fig. 1. Phloeosinus squalidens, in Juniperus or Thuja, from interglacial clays. Natural size; the outlines of the galleries on the right are slightly enlarged.

Fig. 2. Transverse section of 1, showing position of pith and indicating that the flattened condition is at least partially due to a more rapid growth of wood on one side than on the other.

Fig. 3. Galleries of Phloeosinus punctatus in Chamaecyparis lawsoniana.

Fig. 4, 4. Abnormal forms of nuptial chambers of Phloeosinus dentatus in Thuja plicata.

Fig. 5. Normal form of nuptial chamber of same in same.

Fig. 6, 6. Normal forms of nuptial chambers of Phloeosinus punctatus in Juniperus virginiana.

Fig. 7. Abnormal form of nuptial chamber of same in same.

Fig. 8. Normal form of nuptial chamber of Phloeosinus cristatus in Sequoia.

Fig. 9. Abnormal form of nuptial chamber of same in same.

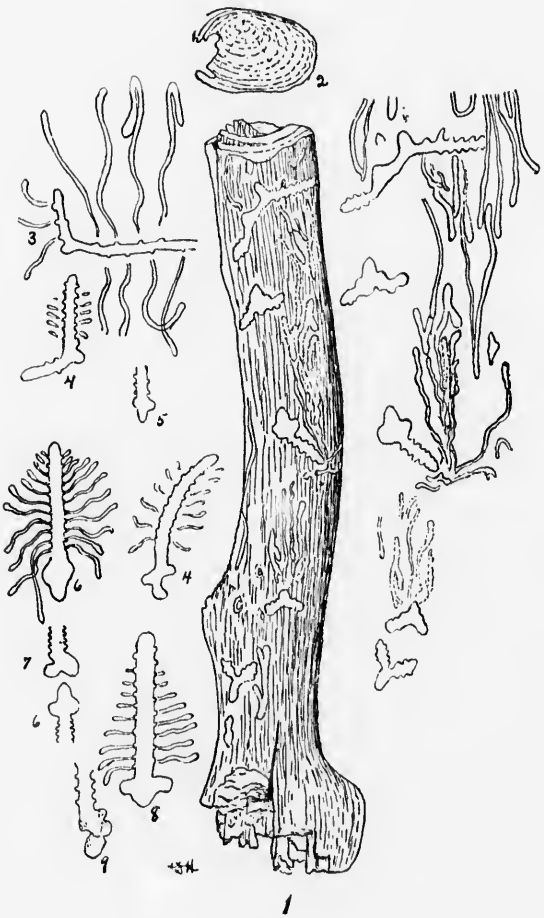
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PLATE XV.

PHLOEOSINUS SQUALIDENS.

Borings in Juniperus or Thuja. *After a photograph by A. D. Hopkins*